

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference see form PCT/ISA/220		FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/IB2005/000344	International filing date (day/month/year) 11.02.2005	Priority date (day/month/year) 13.02.2004	
International Patent Classification (IPC) or both national classification and IPC H02M3/156, F02N11/08			
Applicant TOYOTA JIDOSHA KABUSHIKI KAISHA			

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Gentili, L Telephone No. +31 70 340-2872	
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/000344

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/000344

Box No. IV Lack of unity of invention

1. In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
 - paid additional fees.
 - paid additional fees under protest.
 - not paid additional fees.
2. This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
 - complied with
 - not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
 - all parts.
 - the parts relating to claims Nos.

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes:	Claims	6,13
	No:	Claims	1-5,7-12
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-13
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item IV.

The separate inventions are:

first invention (claims 1-5,7-11 and 13) = a voltage generating device with a voltage generating portion, an observing portion and a control portion

second invention (claims 6 and 12) = a motor vehicle comprising an electricity storage means, a voltage generator device and an automatic engine stop control means

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

Document D1=EP-A2-483744 is prior art for the present patent application. It discloses a voltage generator device comprising (see fig.8):
a voltage generating portion (1,3A,3B,QU,QV,QW,QX,QY,QZ1) that receives an input voltage (E) and generates a target voltage (5);
an observing portion (25) that observes an operating condition of the voltage generating portion ; and
a control portion (4,5,11,22,26,27) which causes the voltage generating portion to maintain a voltage generating operation even if the operating condition observed by the observing portion is within a first region that is apart from a normal region (see page 11 lines 18-22 and fig.10: when the observing portion detects a current whose level is higher than overload current I1 but lower than short circuit current I2 operation of the voltage generating portion is maintained), and which causes the voltage generating portion to stop the voltage generating operation if the operating condition observed is within a second region that is further apart from the normal region than the first region is (page 11 lines 10-17 and fig.10: when current reaches I2 a short circuit is determined and operation is stopped).
Document D1 thus discloses all features of claims 1 and 2.

Regarding the first invention (claims 1-5,7-11 and 13)

The special technical feature of the first invention has to be found in claim 3 and it is: the control portion is adapted to reduce a target value of voltage output by the voltage generating

portion if a value of current through the voltage generating portion increases provided that the operating condition is within the first region.

The problem solved by the first invention is: avoiding overheating of the voltage generating portion.

Regarding the second invention (claims 6 and 12)

The special technical features of the second invention are:

a motor vehicle;

an electricity storing means;

a voltage generator device that compensates for a fall of an output voltage of the electricity storage means; and

an automatic engine stop control means that automatically controls stopping and starting of an engine, and prohibits an automatic stop of the engine if it is detected that the operating condition of the voltage generator device is within the first region.

The problem solved by the second invention is: reducing fuel consumption of an engine of a motor vehicle without impairing correct operation of electric loads of the vehicle.

Since the two inventions solve different technical problems and relate to different and non-corresponding special technical features, the requirements for unity of invention as set forth by Rule 13(1) and (2) PCT are not fulfilled.

It is also pointed out that no generalization of the two problems solved by the two inventions is conceivable that would lead to a common technical problem which could be considered either new or non-trivial for the skilled person.

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1 Reference is made to the following documents:

D2 = US-A-3784893

D3 = EP-A-1079496

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-5 and 7-12 is not new in the sense of Article 33(2) PCT.

It discloses a voltage generator device comprising (see fig.1):
a voltage generating portion (1121-133,108-110,115-117) that receives an input voltage (E_{IN}) and generates a target voltage (E_{OUT});
an observing portion (101,103,106,114) that observes an operating condition of the voltage generating portion ; and
a control portion (104,111-113,135,150,194,187,188) which causes the voltage generating portion to maintain a voltage generating operation even if the operating condition observed by the observing portion is within a first region that is apart from a normal region (column 9 lines 37-53; see also fig.2 operating curves "b" and "g", where operation is maintained at reduced output voltage when current is between 100% and 125% of rated output current), and which causes the voltage generating portion to stop the voltage generating operation if the operating condition observed is within a second region that is further apart from the normal region than the first region is (column 11 lines 30-50 and fig.2 operating curve "e": when current reaches 125% of rated output current operation is stopped).

Document D2 thus anticipates all technical features of claims 1,2,3 and 7,8,9.

From fig.2 and also from column 10 lines 2-21 it is clear also that the control portion stops the operation of the voltage generator if the voltage output is higher than curve "c" (second region) but it maintains the voltage generating operation if the output voltage lies between curves "a" and "c" (first region), where curve "a" denotes normal output voltage and curve "c" a current dependent overvoltage value. Document D2 thus also takes away novelty of claims 4 and 10. Moreover, by identifying in fig.1 block 111 as "voltage detecting circuit" and block 114 as "overvoltage detecting circuit" and by referring again to fig.2, it can be considered that also claims 5 and 11 are anticipated by D2.

Document D3 discloses a control method for a motor vehicle that includes a voltage generator device (34) that compensates for a change in an output voltage of an electricity storage means (generator 34 compensates for lower open-circuit voltage of the storage means 42 by increasing the adjustment voltage VC, see figures 3 and 4) , comprising the steps of:
observing an operating condition (output voltage of generator 34, i.e. voltage VB at node 50)

of the voltage generator device (34) and causing the voltage generator device (34) to maintain a voltage generating operation even if the operating condition is within a first region that is apart from a normal region (this first region corresponds to $VB < VD$, where the generator 34 is obviously maintained in operation to feed the electric loads, even if it cannot charge the battery 34);

controlling stopping and starting of an engine in accordance with a state of the motor vehicle if the operating condition is within the normal region; and
prohibiting an automatic stop of the engine if it is detected that the operating condition is within the first region (see paragraph [30]).

Document D3 thus discloses all features of independent claim 12.

Claim 13 cannot be considered inventive (Article 33(3) PCT) because a computer-recordable medium in which a program for causing a computer to execute a known control method is recorded is, as such, not inventive.

Claim 6 also cannot be considered inventive (Article 33(3) PCT).

Subject matter of claim 6 differs from the motor vehicle of D3 only in that (see reasons already given, mutatis mutandis, for claim 12 above) the voltage generator device (34) includes a voltage generating portion that receives an input voltage and generates a target voltage. D3 does not describe in details the generator 34. The skilled person, when confronted with the task of implementing the generator 34, would chose from one of the motor-generators which are currently available on the market, such as field controlled generators. When choosing such generator, for which the open circuit voltage of the field circuit can be considered as an input voltage, the skilled person would obtain subject matter of claim 6 without employing an inventive activity.

Subject matter of claims 1-13 finds an industrial applicability in the field of power supplies for electric loads in a vehicle.